

SIX NEW NEOTROPICAL SPECIES OF AQUATIC BEETLES
IN THE *EPIMETOPUS COSTATUS* COMPLEX
(HYDROPHILIDAE: EPIMETOPINAE)

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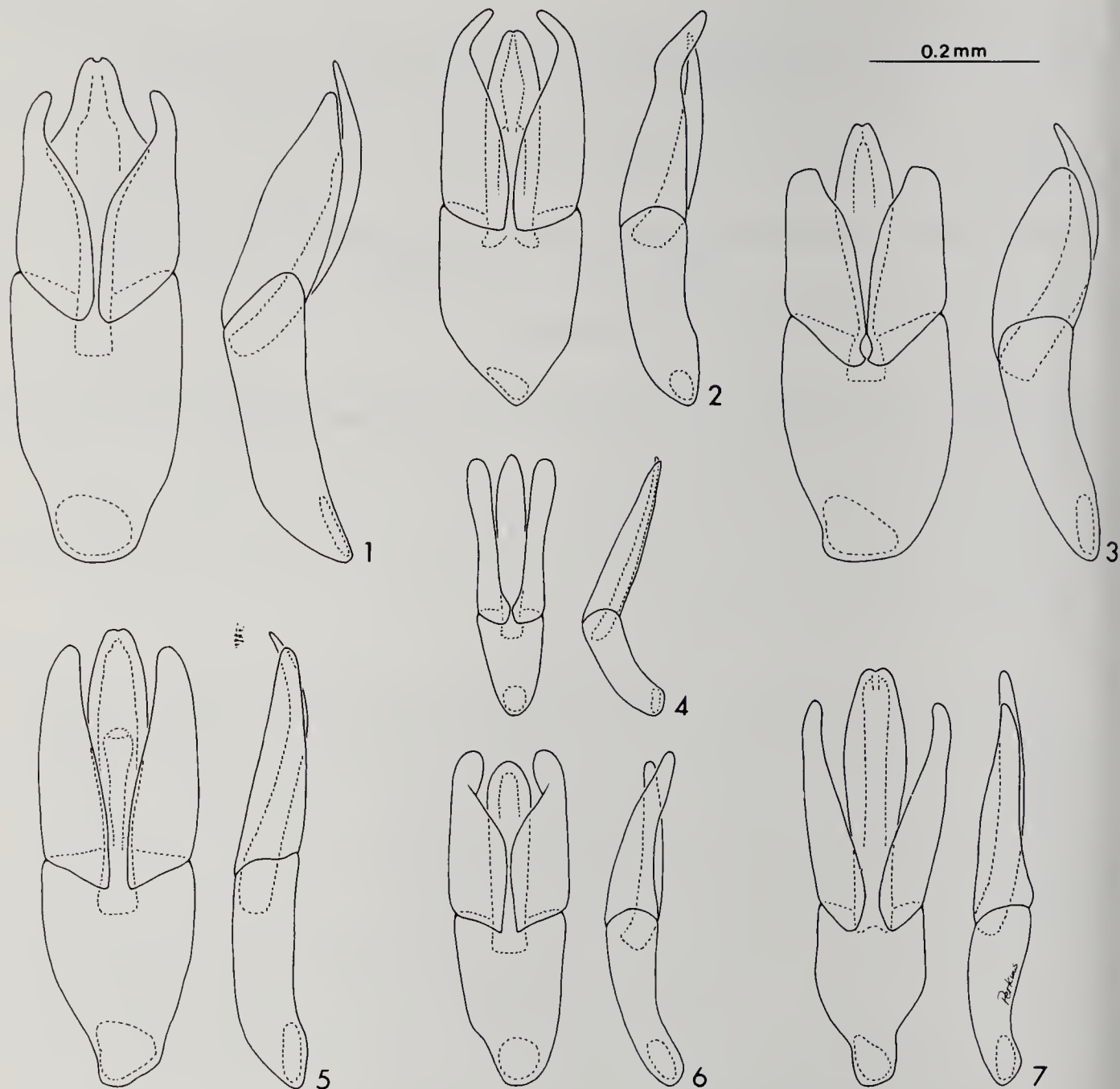
ABSTRACT

Aquatic beetles in the *costatus* Complex of *Epimetopus* (Hydrophilidae: Epimetopinae) are characterized. A lectotype is designated for *E. costatus* (LeConte), and the following new species are described: *E. punctipennis* (Texas, southeastern Arizona, northwestern Mexico), *E. fisheri* (southeastern Arizona, northwestern Mexico), *E. simplex* (Honduras), *E. apocinus* (Costa Rica), *E. costaricensis* (Costa Rica), and *E. panamensis* (Panama). Aedeagi of all species are illustrated. Photomicrographs of *E. punctipennis* are presented.

Beetles of the subfamily Epimetopinae are among the rarest and most unusual of aquatic Hydrophilidae. Contrary to the smooth dorsal habitus of most hydrophilids, epimetopines are very coarsely sculptured, possessing granules, tubercles, costae, and curious cuticular elongations. Only 19 species and 2 genera are currently known for the subfamily. These species are found in India (3), Ceylon (1), Ivory Coast (2), Brazil (7), Bolivia (2), Argentina (1), Colombia (1), and southwestern United States (2). Species from India and Africa have the procoxal cavities open behind and comprise the genus *Eumetopus* J. Balfour-Browne, whereas all New World species have closed procoxal cavities and comprise the genus *Epimetopus* Lacordaire (J. Balfour-Browne, 1949). Species in both genera may have costate and/or tuberculate elytra (Deleve 1967; Rocha 1969).

The *costatus* Complex

Species in this complex are externally quite similar, generally of small size (1.55–1.90 mm), with pronotum and elytra rufescent, the head black. Shape of the laterally produced pronotal lobes, a taxonomically significant region well developed and structurally diverse in other species of the genus (see figures in Rocha 1969), varies insignificantly, if at all, between *costatus* Complex species (e.g., Fig. 8). Variation is seen in elytral sculpture, involving development of punctures and longitudinally elongate "granules". All *costatus* Complex species have four costae on each elytron (one sutural). Between the costae may be found two rows of punctures (as in *E. punctipennis*, *E. fisheri*, and *E. simplex*), or two rows of elongate granules (as in *E. costatus*, *E. costaricensis*, *E. apocinus*, and *E. panamensis*). The serial punctures of *E. punctipennis* and *E. fisheri* are joined one to the other by a tiny darkened (non-elevated) area which probably represents the homologue of the elongate granules seen in other species; these structures are possibly derived from the setal base seen in other genera of Hydrophilidae (*costatus* Complex species lack apparent elytral setae). Within these two elytral types, however, external similarity is great; reliable determinations must be based upon aedeagal form (Fig-



Figs. 1-7, *Epimetopus* aedeagi, holotypes and lectotype: 1, *costatus* (lectotype); 2, *apocinus*; 3, *fisheri*; 4, *simplex*; 5, *panamensis*; 6, *costaricensis*; 7, *punctipennis*.

ures 1-7). The *costatus* Complex consists of *E. costatus* (LeConte) (1874), *E. hintoni* J. Balfour-Browne (1949) (Bolivia), and the six new species described below. Currently available data are insufficient to permit phylogeny reconstruction for this lineage.

Epimetopus costatus (LeConte)
(Figure 1)

Sepidulum costatum LeConte, 1874:48. (Lectotype male deposited in MCZ, herein designated; type-locality: "Texas").—J. Balfour-Browne, 1949:14.—A. A. Rocha, 1969:175.

Diagnosis. Aedeagal form (Fig. 1) must be used to reliably distinguish *E. costatus* from other members of the *costatus* Complex which have the intercostal areas of the elytra with two rows of elongate granules.

Description. Length (excluding head) 1.88 mm; width 0.92 mm. Color rufescent except head black. Head granulate, deflexed; labrum shiny; eye with canthus incomplete. Pronotum 0.64 mm long, 0.68 mm wide, granulate, lateral areas moderately

produced; disc with subrhomboidal relief, anterior of which is slightly elongate, non-granulate, and minutely canaliculate. Elytra 1.24×0.92 mm; each elytron with four costae (one sutural); 3rd costa (from suture) interrupted in anterior 1/4; area between lateral elytral margin and 4th costa with a callus slightly smaller than humeral callus; intercostal areas each with two rows of weakly developed punctures which are longitudinally linked by more apparent elongate granules.

Variation. Some specimens lack elytral punctures, the elongate granules being well developed in these specimens. Females average slightly larger in body size than males.

Distribution. Other than the syntype-series, I have seen only a single male with the following data: Arkansas, Newton Co., Jasper, rich creek bottom, 21-VIII-1948, W. Nutting & F. Werner (PDP). LeConte (1949), in the original description, does not indicate where within Texas the type-series was collected; the specimens are simply labelled "Tex."

Remarks. The syntype-series of *E. costatus* (LeConte) in the Museum of Comparative Zoology consists of six specimens, the second and sixth of which are males; upon dissection these males were found to have the same aedeagal form. The second specimen has been labelled the lectotype, and its aedeagus has been illustrated (Fig. 1).

Epimetopus punctipennis Perkins, **new species**
(Figures 7-10)

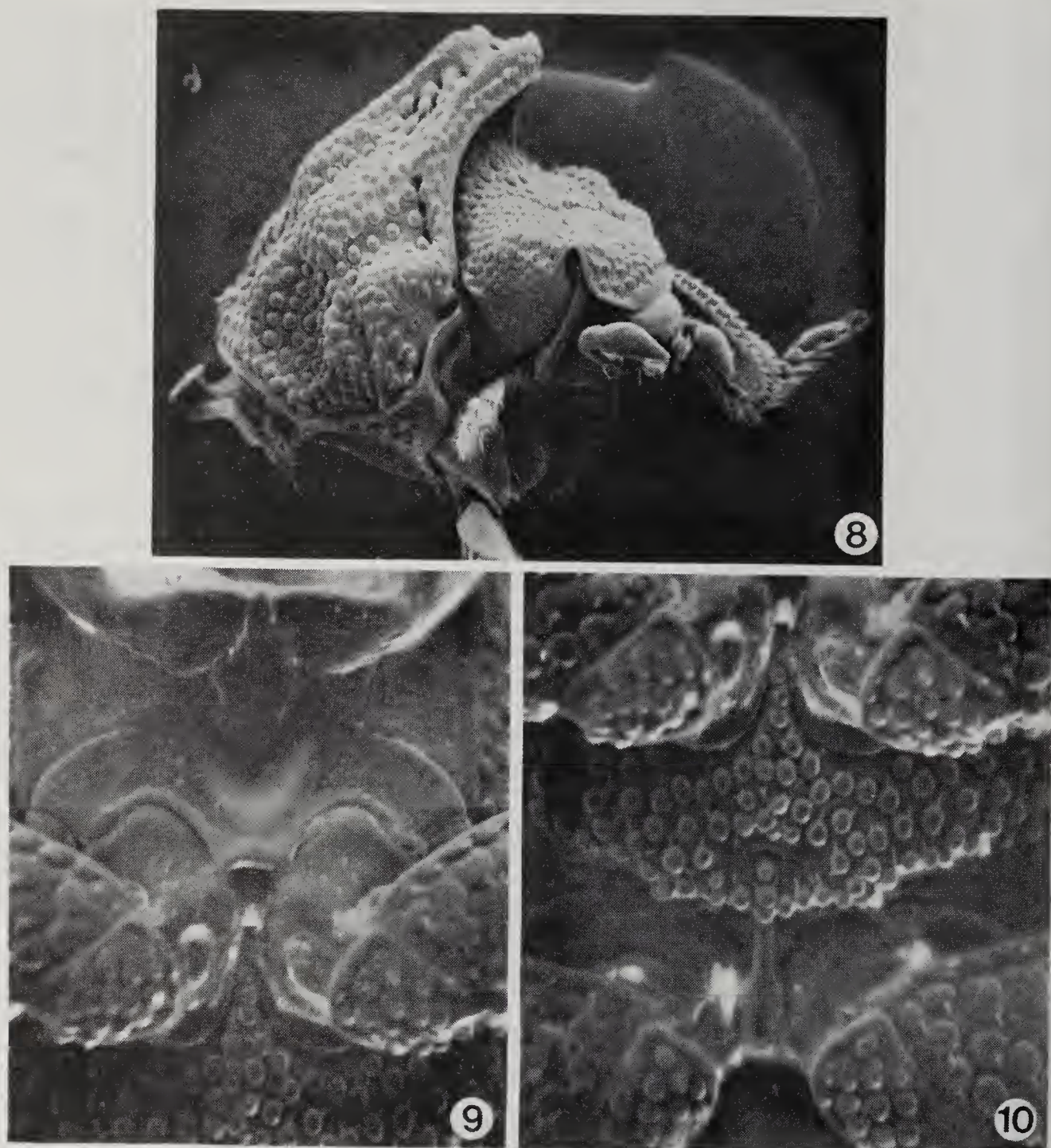
TYPE-DATA: *Holotype* (male). Mexico, Sonora, Rio Cuchujaqui, seven miles SE of Alamos, 25-X-1972, E. M. Fisher. Deposited in the National Museum of Natural History, Smithsonian Institution.

Paratypes (41 males). Mexico; Sonora: Same data as holotype (5 USNM; 2 CAS; 2 MCZ; 2 EMF; 4 PDP). Ten miles E. Navajoa, 13-VIII-59, Nutting & Werner (1 UAZ). Seven miles W. Alamos, 26-XI-60, F. Werner (1 UAZ). United States: Arizona: Pima Co.: Tanque Verde, 23-XI-58, Werner & Adachi (5 CAS; 6 UAZ; 2 USNM; 2 PDP). Texas: Blanco Co.: Cypress Mills, no date or collr. (2 USNM; 2 PDP). McCulloch Co.: 16 miles S. Brady on San Saba River, 13-VI-63, D. C. & K. A. Rentz (1 CAS). "Tex.", no date or collr. (4 USNM).

Diagnosis. Aedeagal form (Fig. 7) must be used to reliably distinguish *E. punctipennis* from other *costatus* Complex species which have two rows of punctures between the elytral costae.

Description. Length (excluding head) 1.64 mm; width 0.76 mm. Head granulate, deflexed; labrum shiny; eye with canthus incomplete. Pronotum 0.60 mm long, 0.60 mm wide, granulate, lateral areas moderately produced; disc with subrhomboidal relief, anterior angle of which is slightly elongate, non-granulate, and minutely canaliculate. Elytra 1.04×0.76 mm; each elytron with four costae (one sutural); 3rd costa (from suture) interrupted in anterior 1/4; area between lateral elytral margin and 4th costa with a callus smaller than humeral callus; intercostal areas each with two rows of well developed punctures, interstices between punctures of a row and between punctures of adjacent rows about 1/2 puncture diameter.

Variation. Some specimens have the elytral punctures separated by only 1/3 the diameter of a puncture; in other specimens as much as puncture diameter. Females average slightly larger in body size than males. Aedeagi of specimens from Cypress Mills, Texas are rather distinct from those of specimens from the type-locality, the former being longer (0.48 vs 0.58 mm), more heavily sclerotized and having the parameres less divergent from base to apex. Aedeagi of specimens from Tanque Verde, Arizona, how-



Figs. 8-10, *Epimetopus punctipennis*, photomicrographs: 8, prothorax and head, lateral view ($90\times$); 9, Mesosternum ($190\times$); 10, Metasternum ($190\times$).

ever, are almost exactly intermediate in these features (0.52 mm long), indicating that these are clinal and not specific differences. Specimens from Texas are also larger in respect to external size than specimens from Arizona or Mexico.

Distribution. Currently known from central Texas, southern Arizona and northwestern Mexico.

Etymology. Latin, *punctipennis*, in reference to the punctate elytra.

Epimetopus fisheri Perkins, **new species**
(Figure 3)

TYPE-DATA: *Holotype* (male). Mexico, Sonora, Rio Cuchujaqui, seven miles SE of Alamos, 25-X-1972, E. M. Fisher. Deposited in the National Museum of Natural History, Smithsonian Institution.

Paratypes (21 males). Mexico: Sonora: Same data as holotype (4 USNM; 2 CAS; 2 MCZ; 2 EMF; 2 PDP). Five miles W. Alamos, black light

trap, 14-VIII-59, W. L. Nutting and F. G. Werner (4 UAZ; 2 USNM; 2 PDP). Alamos, 12-VIII-60, Arnaud, Ross and Rentz (1 CAS).

Diagnosis. Aedeagal form (Fig. 3) must be used to reliably distinguish *E. fisheri* from other species of the *costatus* Complex which also have the elytral costae separated by two rows of punctures.

Description. Length (excluding head) 1.80 mm; width 0.88 mm. Color rufescent except head black. Head granulate, deflexed; labrum shiny; eye with canthus incomplete. Pronotum 0.64 mm long and wide, granulate, lateral areas moderately produced; disc with subrhomboidal relief, anterior of which is elongate, non-granulate, and minutely canaliculate. Elytra 1.16×0.88 mm; each elytron with four costae (one sutural); 3rd costa (from suture) interrupted in anterior $1/4$; area between lateral elytral margin and 4th costa with a callus smaller than humeral callus; intercostal areas each with two rows of punctures which are separated by about $1/2$ puncture diameter.

Variation. Separation of elytral punctures varies from $1/3$ to equal puncture diameter. Some specimens have punctures in rows and those of adjacent rows equally separated; many specimens, especially those from Arizona, have the rows of punctures more widely separated than the distance separating the punctures of a row. Females average slightly larger in body size than males.

Distribution. Currently known from southeastern Arizona and northwestern Mexico.

Etymology. I am pleased to dedicate this new species to my friend and colleague, Eric M. Fisher, who collected the type-series.

Epimetopus simplex Perkins, **new species**
(Figure 4)

TYPE-DATA: Holotype (male unique). Honduras (found in banana debris at Galveston, Texas). Deposited in the National Museum of Natural History, Smithsonian Institution.

Diagnosis. Aedeagal form (Fig. 4) must be used to reliably distinguish *E. simplex* from other species of the *costatus* Complex which have two rows of punctures between the elytral costae.

Description. Length (excluding head) 1.56 mm; width 0.76 mm. Elytra rufescent, pronotum brown, head black. Head granulate, deflexed; labrum shiny; eye with canthus incomplete. Pronotum 0.52 mm long, 0.56 mm wide, granulate, lateral areas moderately produced; disc with subrhomboidal relief, anterior of which is slightly elongate, non-granulate, and minutely canaliculate. Elytra 1.24×0.92 mm; each elytron with four costae (one sutural); 3rd costa (from suture) interrupted in anterior $1/4$; area between lateral elytral margin and 4th costa with a callus smaller than humeral callus; intercostal areas each with two rows of punctures, punctures separated by about puncture diameter.

Distribution. Currently known only from the type-locality.

Etymology. Latin, *simplex*, in reference to the simple aedeagus.

Epimetopus apocinus Perkins, **new species**
(Figure 2)

TYPE-DATA: *Holotype* (male). Costa Rica, Hamburgfarm, Reventazon, Ebene Limon, auf sandbank, 2-II-1935, F. Nevermann. Deposited in the National Museum of Natural History, Smithsonian Institution.

Paratypes (2 males). Costa Rica: Same data as holotype (1 USNM).

Lola nr. Matina, 11-III-65, S. S. & W. D. Duckworth (1 USNM).

Diagnosis. Aedeagal form (Fig. 2) must be used to distinguish *E. apocinus* from other species of the *costatus* Complex which have the elytral costae separated by two rows of elongate granules.

Description. Length (excluding head) 1.64 mm; width 0.80 mm. Color rufescent except head black. Head granulate, deflexed; labrum shiny; eye with canthus incomplete. Pronotum 0.56 mm long, 0.60 mm wide, granulate, lateral areas moderately produced; disc with subrhomboidal relief, anterior angle of which is elongate, non-granulate and canaliculate. Elytra 1.80×0.80 mm; each elytron with four costae (one sutural); 3rd costa (from suture) interrupted in anterior 1/4; area between lateral margin and 4th costa with a callus smaller than humeral callus; intercostal areas each with two rows of weakly elevated, elongate granules.

Variation. No significant variation was seen in the few specimens studied.

Distribution. Currently known only from Costa Rica.

Etymology. Greek, *apokinos*, a comic dance. The aedeagal form is suggestive of a dancer with hands held above head.

Epimetopus costaricensis Perkins, **new species**

(Figure 6)

TYPE-DATA: Holotype (male). Costa Rica, Hamburgfarm, Reventazon, Ebene Limon, auf sandbank, 2-II-1933, F. Nevermann. Deposited in the National Museum of Natural History, Smithsonian Institution.

Paratypes (2 males). Same data as holotype, except "am licht", 1-XI-1934 (2 USNM).

Diagnosis. Aedeagal form (Fig. 6) must be used to reliably distinguish *E. costaricensis* from other *costatus* Complex species which have the elytral costae separated by two rows of elongate granules.

Description. Length (excluding head) 1.56 mm; width 0.80 mm. Color rufescent except head black. Head granulate, deflexed; labrum shiny; eye with canthus incomplete. Pronotum 0.52 mm long, 0.54 mm wide, granulate, lateral areas moderately produced; disc with subrhomboidal relief, anterior angle of which is elongate, non-granulate, and canaliculate. Elytra 1.04×0.80 mm; each elytron with four costae (one sutural); 3rd costa (from suture) interrupted in anterior 1/4; area between lateral elytral margin and 4th costa with a callus slightly smaller than humeral callus; intercostal areas each with two rows of very weakly impressed punctures which are linked one to the other by more apparent, elongate granules.

Variation. No significant variation was seen in the few specimens studied.

Distribution. Currently known only from Costa Rica.

Etymology. Latin, *costaricensis*, in reference to the known distribution.

Epimetopus panamensis Perkins, **new species**

(Figure 5)

TYPE-DATA: *Holotype* (male unique). Panama, Canal Zone, Barro Colorado, 30-II-1945, Zetek. Deposited in the National Museum of Natural History, Smithsonian Institution.

Diagnosis. Distinguished from other *costatus* Complex species which have the elytral costae separated by two rows of elongate granules, by the rather broad form (1.76×0.96 mm), dark brown color of pronotum and elytra, and by the aedeagal form (Fig. 5).

Description. Length (excluding head) 1.76 mm; width 0.96 mm. Color of pronotum and elytra dark brown, head black. Head granulate, deflexed; labrum shiny; eye

with canthus incomplete. Pronotum 0.60 mm long, 0.64 mm wide, granulate, lateral areas moderately produced; disc with subrhomboidal relief, anterior angle of which is elongate, non-granulate and canaliculate. Elytra 1.16×0.96 mm; each elytron with four costae (one sutural); 3rd costa (from suture) interrupted in anterior 1/4; area between lateral elytral margin and 4th costa with a callus slightly smaller than humeral callus; intercostal areas each with two rows of very weakly developed punctures which are longitudinally linked by more apparent, elongate granules.

Distribution. Currently known only from the type-locality in Panama.

Etymology. Latin, *panamensis*, in reference to the known distribution.

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